Rhodora

JOURNAL OF THE

NEW ENGLAND BOTANICAL CLUB

Conducted and published for the Club, by

MERRITT LYNDON FERNALD, Editor-in-Chief

CHARLES ALFRED WEATHERBY
ALBERT FREDERICK HILL
STUART KIMBALL HARRIS
} Associate Editors

Vol. 49. July, 1947. No. 583.

CONTENTS:

Lemna minor as an aggressive Weed in the Sudbury River. *Richard J. Eaton.* 165

Distribution of Red Cedar in eastern Massachusetts. *A. C. Leopold.* 172

Additions to and Subtractions from the Flora of Virginia (concluded). *M. L. Fernald.* 175

Inadequate Basis of the Name Carya Pecan. *M. L. Fernald.* ... 194

The New England Botanical Club, Inc.

8 and 10 West King St., Lancaster, Pa.

tanical Museum, Oxford St., Cambridge 38, Mass.

RHODORA.—**A monthly journal of botany, devoted primarily to the flora of the Gray's Manual Range and regions floristically related. Price, $4.00 per year, net, postpaid, in funds payable at par in United States currency in Boston; single copies (if available) of not more than 24 pages and with 1 plate, 40 cents, numbers of more than 24 pages or with more than 1 plate mostly at higher prices (see 3rd cover-page). Volumes 1–9 can be supplied at $4.00, 10–34 at $3.00, and volumes 35–46 at $4.00. Some single numbers from these volumes can be supplied only at advanced prices (see 3rd cover-page). Somewhat reduced rates for complete sets can be obtained on application to Dr. Hill. Notes and short scientific papers, relating directly or indirectly to the plants of the northeastern states, will be considered for publication to the extent that the limited space of the journal permits. Forms may be closed five weeks in advance of publication. Authors (of more than two pages of print) will receive 15 copies of the issue in which their contributions appear, if they request them when returning proof. Extracted reprints, if ordered in advance, will be furnished at cost.**

Address manuscripts and proofs to
M. L. Fernald, 14 Hawthorn Street, Cambridge 38, Mass.

Subscriptions (making *all remittances* payable to RHODORA) to

Dr. A. F. Hill, 8 W. King St., Lancaster, Pa., or, preferably, Botanical Museum, Oxford St., Cambridge 38, Mass.

Entered as second-class matter March 9, 1929, at the post office at Lancaster, Pa., under the Act of March 3, 1879.

Rhodora

JOURNAL OF

THE NEW ENGLAND BOTANICAL CLUB

Vol. 49. July, 1947. No. 583.

LEMNA MINOR AS AN AGGRESSIVE WEED IN THE SUDBURY RIVER

Richard J. Eaton

For the past ten years a remarkable development of *Lemna minor* in the late summer and early autumn has become a conspicuous and rather disconcerting feature of the Sudbury River in eastern Massachusetts. During periods of peak abundance, as in mid-September, 1936, when I first noticed it, the entire river surface, except around sharp bends and in the narrows where the flow is accelerated, is for many miles literally choked with the floating plants, slowly moving down stream with the current. After copious rains or during prolonged southwesterly winds the Lemna stretches out in long ribbons or streamers, presumably due to the increased rate of flow. As would be expected, the abnormal abundance of the plant—now an annual phenomenon since 1936—varies from week to week and year to year. Short-term fluctuations appear to be related to changes in water temperature, wind and speed of the current. The stream is normally so sluggish in August and September that the rate of vegetative reproduction of the plants in mid-stream far exceeds the capacity of the river to drain them away.

It seems to be reasonably certain that we are discussing a recent phenomenon, the like of which had never before been observed for at least a hundred years. The appearance of the Lemna in 1936 caused a great deal of comment on the part of many people. Keen observers of the older generation, familiar with the river at all seasons from childhood, were quick to say

they had never seen anything like it previously. I find no allusions to any unusual or conspicuous development of Lemna or "green scum" on the river in Thoreau's or Brewster's journals. Surely each of them would have commented on it had they been alive during the present decade.

Curiously enough, a similar invasion of *Lemna minor* was noted in the Charles River (eastern Massachusetts) in 1937 and probably occurred in 1936. Mr. F. W. Hunnewell stated in correspondence (September 16, 1937) that the Charles River had been green with something all summer which, on closer examination, proved to be solid *Lemna minor*. He also referred to friends who live beside the river in Dover and who had been "talking about the unusual 'green scum' for the last couple of years". Mr. S. N. F. Sanford, in a letter of October 11, 1937, enclosed a clipping from an unidentified Boston newspaper published early in September, 1937, under the caption, "Millions of Small Plants Cover Charles". The opening sentence reported, "millions of tiny plants, resembling shamrocks in color and appearance, turned the surface of five miles of the Auburndale section of the Charles River into bright green yesterday . . ." Mr. Sanford visited the Norumbega Park section on September 26, 1937, and found a quantity of *Lemna minor* along both sides of the stream sufficient to attract attention. Mr. Edward Wright of the Massachusetts State Department of Health recently told me that there had been much complaint on the part of patrons of the public bathing places on the river at Dedham late last summer because of the great quantities of a small green plant floating on the water.

The sudden and unprecedented appearance of vast quantities of Lemna at approximately the same time in two unconnected rivers early in September, 1936, and again in 1937 suggested at the time that a somewhat ephemeral "explosion" of the species had occurred due to some extremely unusual combination of favorable factors. To check such a possibility, I examined the excellent daily meteorological records accumulated by Mr. F. A. Tower of Concord for many years. Analysis of daily, weekly and monthly maximum and minimum air temperatures gave no hint of abnormality in 1936 or 1937. Nor was the wind velocity or direction unusual for any period of time. Rainfall data were

equally disappointing. There remained the question of significant variations of soluble nutrients in the water—a question which was pigeon-holed for ten years.

The continued unusual abundance of Lemna in the Sudbury River up until the present time suggested the possibility of a definite change in ecological conditions in the river beginning in the mid-thirties. Lacking the facilities to make a thorough study of this question, I have examined the incomplete water analysis records of the Massachusetts State Board of Health to find a clue to the mystery.

Samples of Sudbury River water taken regularly for many years at several stations between its source and confluence with the Assabet have been analyzed by the State Board of Health. The records are not wholly satisfactory. Those prior to 1900 have been mislaid or lost. The reports for the years 1905–1907 are missing. Although nitrogen in the form of free and albuminoid ammonia is recorded for each sample analyzed, the data for soluble nitrates were unrecorded for the period 1916–1934. The yearly averages given in Table I are derived from analyses of samples taken at reasonably regular intervals varying from 12 to 3 times per year. From 1903 through 1944 six samplings per year between June and November was the general but not invariable practice; in 1945 the number was reduced to four (July, August, October, November). Obviously, such infrequent analyses will show misleading variations in the apparent amount of pollution. Assuming a constant volume of pollution, the analyses during a wet season will differ from those of a dry season; likewise, a sampling after a heavy summer rain may show less pollution than one taken at a low water stage of the river preceding the rain. In the table below, to minimize the chance distortions of the data, the analyses of each sampling have been averaged for each year; and for soluble nitrates these averages in turn combined into three-year averages to show trends. In Table I are shown the yearly and three-year averages for free plus albuminoid ammonia, and the soluble nitrates, all expressed in parts per one million.

That the Sudbury River has become increasingly polluted since 1900 is evident. As measured by the total free plus albuminoid ammonia content of the water, the pollution tide ebbed and

WATER ANALYSIS

Table I.—Free and Albuminoid Ammonia

(parts per 1,000,000)

	Sudbury River at Concord					Charles River at Needham				
	Ammonia			Nitrates		Ammonia			Nitrates	
	Free	Total	3 Yr. Av.		3 Yr. Av.	Free	Total	3-Yr. Av.		3-Yr. Av.
1900	.030	.271		.001		—	—			
1901	.056	.371		.089		—	—		—	
1902	.067	.336	.326	.088	.059	—	—		—	
1903	.050	.329		.057		—	—		—	
1904	.052	.373	.351	.058	.052	—	—		—	
1905	—	—		—		—	—		—	
1906	—	—		—		—	—		—	
1907	—	—	—	—		—	—		—	
1908	.049	.268		.023		—	—		—	
1909	.052	.312		.018		—	—		—	
1910	.052	.298	.293	.028	.023	—	—		—	
1911	.036	.280		.022		—	—		—	
1912	.052	.338		.023		—	—		—	
1913	.166	.495	.371	.083	.043	—	—		—	
1914	.133	.423		.072		.058	.358		.062	
1915	.137	.543		.060	.066	.064	.449		—	
1916	.123	.407	.458	—		.059	.330	.379	—	—
1917	.122	.471		—		.055	.360		—	
1918	.086	.420		—		.088	.441		—	
1919	.111	.452	.448	—		.089	.409	.403	—	—
1920	.125	.333		—		.062	.289		—	
1921	.127	.372		—		.048	.333		—	
1922	.111	.346	.350	—		.043	.238	.287	—	—
1923	.113	.318		—		.072	.294		—	
1924	.101	.286		—		.082	.296		—	
1925	.143	.402	.335	—		.108	.400	.330	—	—
1926	.096	.397		—		.084	.417		—	
1927	.163	.529		—		.069	.458		—	
1928	.113	.394	.440	—		.076	.405	.327	—	—
1929	.106	.326		—		.067	.283		—	
1930	.191	.379		—		.221	.436		—	
1931	.213	.447	.384	—		.121	.397	.372	—	—
1932	.116	.358		—		.069	.288		—	
1933	.257	.532		—		.140	.417		.118	
1934	.177	.432	.441	—		.246	.524	.410	.083	.101
1935	.196	.466		.190		.167	.563		.103	
1936	.243	.501		.340		.198	.679		.210	
1937	.178	.490	.486	.120	.217	.035	.398	.547	.200	.171
1938	.311	.640		.160		.094	.475		.270	
1939	.106	.446		.230		.023	.366		.130	
1940	.096	.502	.529	.200	.197	.040	.352	.398	.120	.173
1941	.076	.488		.250		.072	.412		.130	
1942	.311	1.296		.340		.115	.570		.170	
1943	.135	.442	.742	.170	.253	.145	.445	.476	.270	.190
1944	.206	.513		.220		.096	.461		.326	
1945	.130	.382		.480		.102	.423		.260	
1946	.047	.389	.428	.130	.277	.059	.248	.377	.175	.254

flowed from year to year, but increased each successive nine-year period. By far the greatest increase occurred in the period 1935–1943, from .421 to .586, or 39%. However, the increase was gradual until 1938. No obvious correlation exists between these data and the sudden mass invasion of Lemna in 1936.

Theoretically, the increase of the free ammonia component of the water might be significant. According to M. L. Fernald, "*Lemna minor* usually does not occur in acid or bog waters but in the sub-neutral to basic or slightly alkaline waters which sewage, etc., supply." (1) From 1900 to 1912 free ammonia varied between .030 (1900) and .067 (1902), the average for the period being .0496. From 1913 through 1929 the variation was from .086 (1918) to .166 (1913) and the seventeen year average, .122. In 1930 free ammonia at .191 was higher than in any previous year; and the average for the period 1930–1946 was .176. However, a glance at Table I will show an extremely wide variation (.213 in 1931, .116 in 1932, .243 in 1936, .311 in 1938, .106 in 1939, .076 in 1941, etc.) with no discernible pattern of change. Here, again, the data fail to give any hint as to what trigger action set off the alleged Lemna explosion in 1936.

As measured by the soluble nitrate analyses, the increase in the more readily available plant nutrients is striking. It is an exasperating "rub of the green" that the data are lacking for precisely those years when they are the most significant. The yearly, three- and nine-year averages show a relatively stable low-level nitrate component from 1900 through 1915, after which year no figures for nitrates were compiled until 1935. In that year, the average was 3.1 times the 1915 level; and the 1935–1937 average was 3.0 times the 1913–1915 average. The lowest three-year average of data from 1935 to 1946 is three times as great as the highest three-year average during 1900 to 1915.

An inspection of similar records of analyses of Charles River water sampled at Needham reveals a similar pollution pattern. The records begin with the year 1914, there being a gap in the data for soluble nitrates from 1915–1932. The average of nitrates for 1914 was .062, as compared with .072 for the Sudbury in the same year. The three-year average, 1933–1935, was .101. The average for 1936 was .210, about twice the amount recorded

in 1935, and more than three and a half times the amount recorded for 1914. From 1936 on, the three-year averages varied from a high of .255 to a low of .127. The 1936–1946 average was .206. The trend of ammonia pollution was comparable to conditions in the Sudbury, and apparently uncorrelated with the Lemna invasion.

Thus, there is a possible correlation between the increase of Lemna and the increase of river pollution, particularly in the form of soluble nitrates. It is assumed that a combination of factors has created optimum ecological conditions for the development of Lemna in the two rivers beginning in the mid-thirties. It is possible that the naturally acid water of these streams may have finally become sub-neutral or slightly alkaline as a result of the gradual increase of free ammonia, thus providing ideal conditions for rapid development of Lemna when copious supplies of nutrients became available. Doubtless there are other factors at work which some inquisitive ecologist may be tempted to investigate. A series of controlled experiments in the propagation of *Lemna minor* under varying conditions might yield interesting results. In fact, the effect of water pollution on aquatic vegetation deserves far more intensive study than has as yet been devoted to the subject, not only in the interest of pure science, but to give aid and comfort to the economic biologist on whom the population of the world will be increasingly dependent during the century to come.

The question naturally arises whether Lemna is peculiarly responsive to the increase of pollution which is tentatively proposed as responsible for its aggressive behavior. What about other aquatics? Although I lack any precise data on the subject, there seem to have been marked vegetational changes in the Sudbury River during the past fifteen years. *Trapa natans* was introduced from Europe in the river a great many years ago. There is a specimen in the Herbarium of the New England Botanical Club from Concord dated August 29, 1859. In the course of time it became generally distributed along many miles of the river and in certain favorable back waters formed dense mats a rod or two in diameter. On the whole, however, it remained relatively unaggressive and well behaved until recently. Last summer I noticed that it had taken complete possession of

long stretches of the river-margin from Fairhaven Bay to Concord Village and beyond, where ten years ago the native vegetation was predominant. In contrast, I became acutely conscious of the scarcity of *Nymphaea odorata*, formerly a conspicuous and abundant feature of the river, but now rapidly fading out even in places not yet invaded by Trapa.

Impressions are misleading, but in this case are so striking that they immediately renewed my interest in the ten-year-old Lemna problem. I asked Dr. H. B. Bigelow, who has lived beside the river for many years, if he could confirm my feeling about the recent scarcity of Nymphaea. He writes (2), ". . . it is certainly a fact that the water lilies have been very much reduced in number since the Lemna came." He also discussed "the still more spectacular explosion of the . . . water chestnut (*Trapa natans*) that took place in our part of the river summer before last and which continued during this past summer . . . All the years I have lived there (on the bank of the Sudbury River), there have been a few of them scattered among the water lilies, etc. Summer before last the thing ran wild and last summer it so multiplied in our stretch that no water at all was to be seen, except along the thread of the stream. In fact, the shallow parts looked like dry land and it was difficult to shove a canoe through it." Here is comforting corroboration of my own impressions from a competent naturalist and trained observer.

It is noteworthy that *Nymphaea odorata* occurs chiefly in neutral to slightly acid water overlying rich organic muds, whereas Trapa in its native habitat, according to Hegi, is found in "weakly calcareous but rich warm muds". (3) As for the Lemnaceae, Fassett states that "the genera . . . occur in hard water". (4)

These facts tend to support the hypothesis that alkaline sewage wastes have an important bearing on the weedy behavior of *Lemna minor* in Sudbury and Charles Rivers.

Lincoln, Mass.

References

(1) M. L. Fernald, in litt. Feb. 8, 1947.
(2) H. B. Bigelow, in litt. Feb. 18, 1947.
(3) Hegi: Ill. Flora of Middle Europe, Vol. V_2, p. 885, Munich 1925–26.
(4) N. C. Fassett, Manual of Aquatic Plants. New York, 1940.

THE DISTRIBUTION OF RED CEDAR IN EASTERN MASSACHUSETTS

A. C. Leopold

Foresters recognize two main forest associations in southern New England. One of these, the Central Hardwoods association, is characterized by white oak, black oak and hickory. This association originally covered most of Connecticut, Rhode Island and the eastern margin of Massachusetts. The other association, the Transition Hardwoods, characterized by red oak, white ash, sugar maple, red maple and black birch, originally covered most of central Massachusetts and extended north into New Hampshire and Maine.

The plant succession of old fields to oak-hickory stands of the Central Hardwoods type in Connecticut has been described by Lutz[1] as having an initial stage of red cedar and gray birch. Old fields in central Massachusetts commonly come up to white pine which gives way over a long period of time to the Transition Hardwoods. The approximate boundary in eastern Massachusetts between old fields which come up to red cedar and those which come up to white pine was mapped by Raup[2]. He suggested that this was also the boundary between Central Hardwoods and Transition Hardwoods. Naturally this is not a distinct and explicit line, but rather a transition zone.

In an attempt to analyze the boundary described by Raup, a small section of it just west of the Boston area has been mapped in considerable detail. The boundary and the area mapped are indicated in Figure I. Red cedar (*Juniperus virginiana* L. var. *crebra* Fernald & Griscom) is found in old fields south of the boundary, and white pine in old fields north of the boundary. The area mapped is coextensive with the United States Geological Survey quadrangles of Concord, Maynard, Hudson, Natick, Framingham and Marlboro, Massachusetts, and measures seventeen by nineteen miles overall.

The mapping technique consisted of driving back and forth across the area recording the location of old fields containing red cedar or white pine visible from the road. The method has several limitations. First of all, all of the old fields in the area cannot be mapped, and the sampling is bound to be irregular

since there is no systematic checkerboard of roads. Also, the proportion of fields abandoned varies from place to place. Furthermore there is undoubtedly some selection by the farmer in favor of the pine and against the cedar. Lastly, a stand of white pine persists for over a hundred years or until cut off, whereas a stand of cedars is commonly overtopped by its fast-growing hardwood successors in only a couple of decades, and soon disappears from the stand.

In spite of the shortcomings imposed by this mapping technique, the data obtained make up something of a pattern. To show it graphically a grid system was superimposed, and the percentage of old fields containing red cedar in each grid was calculated. These percentages have been entered to the nearest ten percent in Figure II, and isopleths have been sketched in to accentuate the grouping of the percentages.

The isopleth map is simply a graphic representation of the manner in which red cedar tapers off in frequency at this transition boundary. In the mapped area the boundary runs north and south. A gradient in frequency from east to west is evident, and occasional "islands" of higher frequency can be seen west of the boundary proper.

It should be pointed out that the boundary in Figure I was not intended to encompass the range limits of red cedars. Specimens have been collected in Maine one hundred miles north of this line. However the frequency of their occurrence takes a strong drop at this boundary where they lose their position as members of the succession in old fields.

The cedar boundary in eastern Massachusetts shows rather remarkable similarities to isotherms of cold weather phenomena. The United States Weather Bureau maps (3) of average annual January temperature (26 degree isotherm), average annual minimum temperature (–10 degree isotherm), average number of days without killing frost (170 day isopleth), and the average date of last frost (April 30 isopleth) all repeat the same general pattern (Figure III). The first of these was used in Koppen's original classification of climates (4) as the boundary between warm temperate and cold temperate climates. Recognizing the limitations of Weather Bureau data as indicators of actual field conditions, nevertheless it is certainly suggestive that this vege-

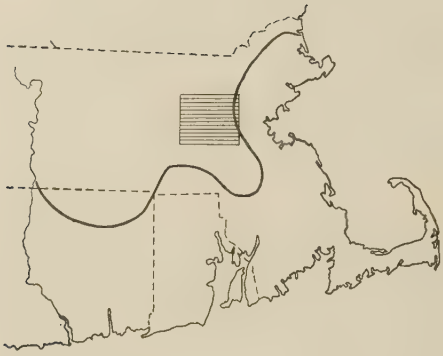

FIGURE I. The approximate northern boundary of old field red cedar in southern New England, and the area mapped in this study.

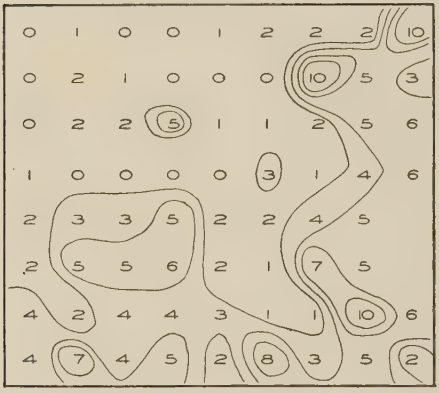

FIGURE II. Frequency distribution of red cedar in the area mapped. Percentages of fields containing cedar are indicated in tens, and isopleths are drawn in at 20% intervals.

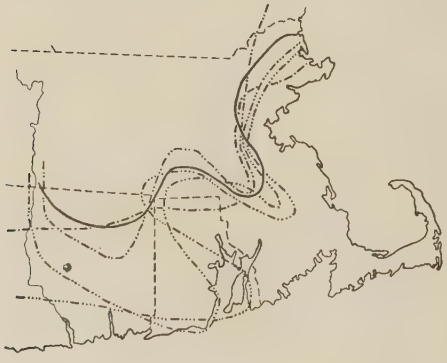

FIGURE III. Comparison of the red cedar boundary with:

—·— Ave. annual Jan. temperature (26 degree isotherm)
—··— Ave. annual minimum temperature (−10 degree isotherm)
—···— Ave. days without killing frost (170 day isopleth)
—····— Ave. date of last frost (April 30 isopleth).

tation boundary should approximate in considerable measure the same general pattern as *four* low temperature phenomena.

Biological Laboratories,
Harvard University.

Literature Cited

(1) Lutz, H. J., Trends and silvicultural significance of upland forest successions in New England. Yale Univ. Sch. For. Bull. no. 22. 1928.
(2) Raup, H. M., Old field forests of southeastern New England. Jour. Arnold Arboretum XXI, 266–273. 1940.
(3) U. S. Department of Agriculture, Climate and Man. Washington. 1941.
(4) Koppen, W., and R. Geiger, Handbuch der Klimatologie, Berlin. 1936.

ADDITIONS TO AND SUBTRACTIONS FROM THE FLORA OF VIRGINIA

M. L. Fernald

(*Continued from page 159*)

*Gentiana Catesbaei Walt., var. **nummulariaefolia,** var. nov. (tab. 1078, fig. 3 et 4), a var. typica recedit folliis elliptico-ovalibus utrinque obtusis vel subrotundis 1–1.8 cm. longis 6–12 mm. latis membranaceis; calycis lobis late oblanceolatis ad 4.5 mm. latis.—Greensville County, Virginia: sphagnous bog about 1 mile northwest of Dahlia, October 12, 1938, *Fernald & Long*, no. 9618 (type in Herb. Gray.).

Gentiana Catesbaei, var. *nummulariaefolia* has for several years stood apart in the herbarium from all other material of the species and it seems very definite. Typical *G. Catesbaei* (plates 1078, figs. 1 and 2, and 1079), frequent in southeastern Virginia, has firm narrowly lanceolate to oblong-ovate acute or subacute leaves mostly 3–7 cm. long, though in the most extreme dwarfs down to 1.5 cm. but acutish; and its calyx-lobes are linear or narrowly lanceolate. Var. *nummulariaefolia*, on the other hand, has small membranaceous blunt or round-tipped elliptic-oval leaves only 1–1.8 cm. long, and its dilated calyx-lobes are broadly oblanceolate.

As I pointed out in Rhodora, xli. 555 (1939), Walter had two species of *Gentiana* with campanulate-ventricose corollas. What he took for *G. Saponaria* L. was described "corollis viridescentibus, foliis ovatis trinerviis" and (as shown by Walter's

material) was the misnamed greenish-flowered *G. villosa* L. Since *G. villosa*, as shown by its type, is strictly glabrous, Walter, quite naturally, did not so identify his greenish-flowered plant. Walter's *G. Catesbaei* was defined "corollis extus caeruleis, foliis lanceolatis remotis". The material in Walter's Herbarium shows, besides a summit of *G. villosa*, one of true *G. Saponaria* L. The other two specimens (our PLATE 1078, FIGS. 1 and 2) are the new element, *G. Catesbaei*, the larger specimen (FIG. 1) so marked by the late James Britten (apparently). Besides them (PLATE 1079) I am showing summits of two modern specimens from eastern Virginia. These are of the plant described from "Pine-barren swamps near the coast, Georgia and Florida", as *G. Elliottii* Chapm., var. *parvifolia* Chapm. Fl. So. U. S. 356 (1860), specimens before me, and which has been variously known as *G. Elliottii* Chapm., *G. parvifolia* (Chapm.) Britton and *Dasystephana parvifolia* (Chapm.) Small. Since some have doubted the identity of *G. Catesbaei* I am showing the type-material.

Although Walter did not cite Catesby's plate, his intent in giving the name *G. Catesbaei* is pretty obvious. As M. A. Curtis wrote in Bost. Journ. Nat. Hist. i. 128 (1835): "*Gentiana Catesbaei*. This species is readily distinguished from G. saponària, by the long linear segments of the calyx and its open corolla. It is finely delineated in Bigelow's Medical Botany. Tab. 70. of Catesby's Carolina, represents it". Both Bigelow's plate of *G. Catesbaei*, received from Charleston, South Carolina, and Catesby's are indeed very fine; and Bigelow pointed out that it is not *G. Saponaria* for "It differs widely, however, from that species in the size of its leaves, the length of its calyx, the open mouth of its corolla and shape of its segments." Catesby, like Bigelow, showing the open summit of the corolla, said "blue flowers; which, before they open, are in form of a Rolling-pin; but, when blown, are in shape of a Cup, with the verge divided into five sections". There should be no question about the identity of *G. Catesbaei*.

BARTONIA VERNA (Michx.) Muhl. In RHODORA, xlviii. 327 (1946) I explained my reasons for believing that the basis of the record of this vernal species from Virginia was a confusion made by Pursh in 1814. If the species is later found in the state it will presumably be as a considerable northern extension of range.

PHACELIA MACULATA Wood, Am. Bot. Fl. 255 (1873). *P. fallax* Fernald in RHODORA, xlvi. 51, t. 814 (1944).

Dr. Lincoln Constance calls my attention to Wood's species from Stone Mountain (type-region of *Phacelia fallax*), Wood's species very generally overlooked by American botanists and somewhat obscured by the entry in Index Kewensis "Quid?".

SCUTELLARIA INTEGRIFOLIA L., var. HISPIDA Benth. To the stations in Norfolk and Gloucester Counties cited by Epling in Univ. Calif. Publ. xx. 93 (1942) add one in NANSEMOND COUNTY: sphagnous and peaty bog by Norfolk and Western Railway, about ½ mile west of Kilby, *Fernald & Moore*, no. 15,149. See p. 94.

*S. INTEGRIFOLIA, var. MULTIGLANDULOSA Kearney (*S. multiglandulosa* (Kearney) Small). Range extended north from Georgia. NANSEMOND COUNTY: sphagnous and peaty bog (Magnolia swamp) by Norfolk and Western Railway, 1–1½ miles west of Kilby, *Fernald, Long & Clement*, no. 15,345. SOUTHAMPTON COUNTY: upper border of sandy and peaty shore of Darden's Pond, north of Courtland, *Fernald, Long & Clement*, no. 15,346.

Close matches for specimens identified by Epling as an "unusually stable" species, *Scutellaria multiglandulosa*, although it is difficult to believe that the "stability" would hold over a considerable area and that *S. multiglandulosa* is more than a somewhat minor variation of *S. integrifolia*, perhaps extending still farther north. Epling, l. c. 94, cites 18 collections of var. *multiglandulosa* (his *S. multiglandulosa*). Under 4 citations he adds: "occurs here with *S. integrifolia* subsp. *hispida*" or phrases of the same import. In Nansemond County the two are in bogs toward a mile apart! See pp. 99 and 101.

*LYCOPUS EUROPAEUS L., var. MOLLIS (Kern.) Briq. Numerous stations in southeastern Virginia. NORFOLK COUNTY: old collection from Norfolk, coll. *Rugel?*; between Princess Anne and Berkely, *Heller*, no. 1072. NANSEMOND COUNTY: border of fresh to brackish marsh, near Western Branch, south of Reid's Ferry, *Fernald & Long*, no. 13,438. ISLE OF WIGHT COUNTY: along path, Burwell's Bay, James River, below Rushmere (Fergusson's Wharf), *F. & L.*, no. 12,791. SURRY COUNTY: springy swale by Cobham Bay, James River, northwest of Chippokes, *F. & L.*, no. 12,790; roadside by sandy thicket, Sunken Meadow Beach, *F. & L.*, no. 6865.

Typical *Lycopus europaeus* L., recorded from Virginia but not seen from there by me, has the leaves broadly lanceolate to nar-

rowly ovate, acuminate, the lower and median primary ones deeply pinnatifid or incised, with the longest teeth or lobes 1–4 cm. long, the upper surface strigose, the lower surface but slightly pubescent to glabrescent. It is occasional in waste near Boston and is represented by *House*, nos. 19,639 and 20,772 from Monroe County, New York. Most eastern American specimens belong to var. *mollis*, which has smaller oval, obtuse to subacute leaves with short and blunt teeth and villous or soft-pilose beneath.

Physalis pubescens L. Add another station in Nansemond County: wet peaty and sandy shore of Exchange Pond, southwest of Everett's Bridge, *Fernald, Long & Clement*, no. 15,348.

*P. heterophylla Nees, var. **clavipes,** var. nov. (tab. 1080 et tab. 1081, fig. 4 et 5), rhizoma sublignea 1 cm. crassa; caule basin versus subligneo ad 1.5 cm. crasso; internodiis pilosis glandulosisque, pilis confertis 0.5 mm. longis; foliis membranaceis translucentibus, venis venulisque conspicuis, subtus villoso-strigosis, margine divergenter acute dentato.— Southampton County, Virginia: sandy woods near Darden's Pond, northeast of Courtland, September 16, 1946, *Fernald, Long & Clement*, no. 15,347 (type in Herb. Gray.; isotype in Herb. Phil. Acad.). See p. 102.

In its thick, subligneous and heavy deeply buried horizontal rhizome, its strongly subligneous subterranean (often clubshaped) vertical base of the fruiting stem, in the very thin and conspicuously veiny leaves, very evidently translucent to transmitted light, var. *clavipes* stands out from the other three recognized varieties of *Physalis heterophylla*. Typical *P. heterophylla* (plate 1081, figs. 1–3), has the horizontal rhizome (fig. 1) slender and cord-like and the buried vertical base of the stem relatively slender and not ligneous, the leaves less prominently toothed and, when illuminated from below (fig. 3), appearing dense and opaque. The pubescence of the internodes is dense, with abundant glands and very short intermixed pilosity. Var. *ambigua* (Gray) Rydb. (plate 1082, figs. 1–3) has the slender rhizome and base of stem, but its internodes are spreading-villous with slender trichomes up to 2 or 3 mm. long and its leaves are thick as in typical *P. heterophylla* and (fig. 3) nearly as opaque. Var. *nyctaginea* (Dunal) Rydb. (figs. 4–6) has the slender rhizome and base of stem and the pubescence of internodes as in var. *ambigua*, but the only slightly toothed or entire leaf is thin and membranaceous and subtranslucent but without

the very obvious veins and veinlets of var. *clavipes*. All the four varieties occur in southeastern Virginia. To clear the record, specimens from the southeastern counties are cited below.

P. HETEROPHYLLA Nees (typical). PRINCE GEORGE COUNTY: rich alluvial woods and thickets by James River, Upper Brandon, *Fernald & Long*, no. 9425. SUSSEX COUNTY: border of dry sandy woods, 4 miles south of Stony Creek, *Fernald, Griscom & Long*, no. 6684, in somewhat thickened and subligneous base and in toothing of leaves transitional to var. *clavipes*.

P. HETEROPHYLLA, var. AMBIGUA (Gray) Rydb. ISLE OF WIGHT COUNTY: dry sandy woods about 1 mile north of Pons, *Fernald & Long*, no. 13,440; sand-beach along James River, Ragged Island, northeast of Carrollton, *Fernald & Long*, no. 12,795.

*P. HETEROPHYLLA, var. NYCTAGINEA (Dunal) Rydb. PRINCE GEORGE COUNTY: rich alluvial thicket back of sand-beach of James River, Jordan Point, *Fernald & Long*, no. 9427. SURRY COUNTY: rich alluvial woods and thickets back of sand-beach of James River, Eastover, *F. & L.*, no. 8840. SOUTHAMPTON COUNTY: dry sandy old clearing near Nottoway River, north of Smith's Ferry, *Fernald & Long*, no. 8841. GREENSVILLE COUNTY: open thickets, clearings, and borders of woods southeast of Emporia, *F. & L.*, no. 9428. Several collections from western counties.

PENSTEMON CANESCENS Britton. Range extended from the outer Piedmont well out into the Coastal Plain. HENRICO COUNTY: rich wooded slopes by James River, west of Varina, *Fernald & Long*, no. 13,133. PRINCE GEORGE COUNTY: dry wooded slopes of gullies near Powell's Creek, Garysville, *F. & L.*, no. 8456. SUSSEX COUNTY: dry sandy hickory and oak woods, Burt, *F. & L.*, no. 6385 (distrib. as *P. australis* Small). Identifications confirmed by Dr. Pennell.

Penstemon canescens adds another to the long list of primarily montane species with extensions out to the Coastal Plain, for Pennell, Scroph. E. Temp. N. Am. 221, and map 48, p. 219 (1935) found it to be a plant of "the Appalachian Mountains, both Eastern and Western . . .; eastward descending along rivers into the Piedmont, . . . on the James River reaching nearly to the Fall Line." At Varina it is associated with many inland or upland plants: *Carex conjuncta* Boott, *C. tenera* Dewey, *C. normalis* Mackenz., *Xanthorhiza simplicissima* Marsh., *Corydalis flavula* DC., *Scutellaria elliptica* Muhl., var. *hirsuta* (Short) Fern. (first station east of Blue Ridge), etc. Along Powell's

Creek it is associated with many prevailingly inland species: *Carex Frankii* Kunth, *Stellaria pubera* Michx., *Ranunculus micranthus* Nutt., *Sedum ternatum* Michx., *Phaseolus polystachios* (L.) BSP., *Ruellia strepens* L. and *Chrysogonum virginianum* L. The patch of hickory and oak woods near Burt is, as pointed out in Rhodora, xxxix. 342 (1937), a bit of upland forest on the Coastal Plain, with such inland species as *Festuca paradoxa* Desv., *Hexalectris spicata* (Walt.) Barnh., *Clematis ochroleuca* Ait., *Lathyrus venosus* Muhl., *Scrophularia marilandica* L. and *Houstonia tenuifolia* Nutt. *Penstemon canescens*, pushing out to the Coastal Plain, stays with its inland associates.

Chelone obliqua L. To the few recorded stations add another in Nansemond County: along rill in rich sandy and loamy oak and hickory woods just east of Suffolk, *Fernald, Long & Clement*, no. 15,350. See p. 96.

*Galium tinctorium L., var. floridanum Wiegand in Bull. Torr. Bot. Cl. xxiv. 397 (1897). Range extended north from Florida. Princess Anne County: border of fresh pond back of the dunes, Chesapeake Beach, *Fernald, Long & Clement*, no. 15,358; wet sandy soil, Cape Henry, *L. F. & Fannie R. Randolph*, no. 332, as *G. Claytoni;* marshes bordering ponds, Dam Neck, *Fernald & Long*, no. 4206, as *G. Claytoni*. Southampton County: alluvial woods, bottomland of Mill Creek, Hart's Bridge, *F. & L.*, no. 8481, as *G. Claytoni*. See p. 100.

Wiegand, in his early revision of the group, treated *Galium tinctorium* as a heteromorphic species, his *G. tinctorium* proper being the plant we now know as *G. obtusum* Bigelow; his *G. tinctorium*, var. *filifolium* being *G. obtusum*, var. *filifolium* (Wieg.) Fernald; and his *G. tinctorium*, var. *labradoricum* being the wholly different *G. labradoricum* (Wieg.) Wieg. Wiegand treated as *G. Claytoni* Michx. a very weak plant with the leaves scabrous- or bristly-margined, the sprawling stems with prostrate, matted basal offshoots and 3 (sometimes 4)-lobed corollas at most 1.5 mm. broad. This plant, as shown by me in Rhodora, xxxvii. 443–445, plate 403, figs. 1 and 2 (1935), is really the true *G. tinctorium* of Linnaeus, while *G. tinctorium* sensu Wiegand is *G. obtusum* Bigelow, Fl. Bost. ed. 2: 54 (1824). Although *G. tinctorium* sensu Wiegand was not the true *G. tinctorium* of Linnaeus, and although *G. tinctorium*, var. *labradoricum* Wiegand and *G. tinctorium*, var. *filifolium* Wiegand are not conspecific with the Linnaean *G. tinctorium* (*G. Claytoni* Michx.), it so hap-

Photo. B. G. Schubert

GENTIANA CATESBAEI: FIGS 1 and 2, Walter's TYPE, after photo. from Dr. *J. Ramsbottom*
Var. NUMMULARIAEFOLIA: FIGS. 3 and 4, TYPE, × 1

Photo. B. G. Schubert

GENTIANA CATESBAEI: FIGS. 1 and 2, inflorescences, × 1, of modern specimens

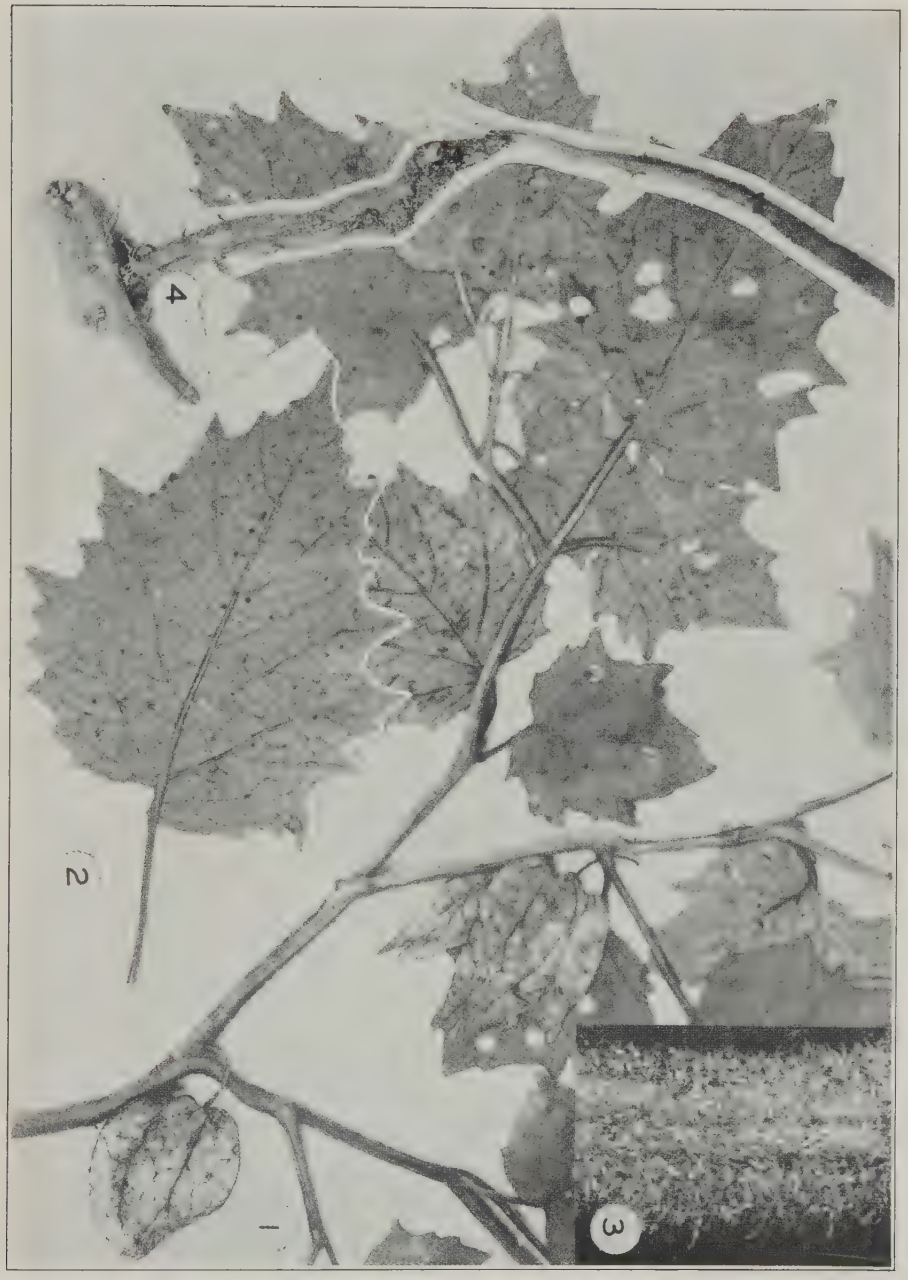

Photo. B. G. Schubert

PHYSALIS HETEROPHYLLA, var. CLAVIPES; all figs. from TYPE: FIG. 1, portion of fruiting plant, × 1; FIG. 2, a large leaf, × 1; FIG. 3, pubescence of stem, × 10; FIG. 4, a base, with portion of horizontal subterranean rhizome, × 1

Photo. B. G. Schubert

PHYSALIS HETEROPHYLLA: FIG. 1, base of plant and leaf at upper right, × 1; FIG. 2, pubescence of stem, × 10; FIG. 3, leaf, × 1, illuminated from below

Var. CLAVIPES, both figs. from type: FIG. 4, leaf, × 1, illuminated from below; FIG. 5, base of large plant, × 1

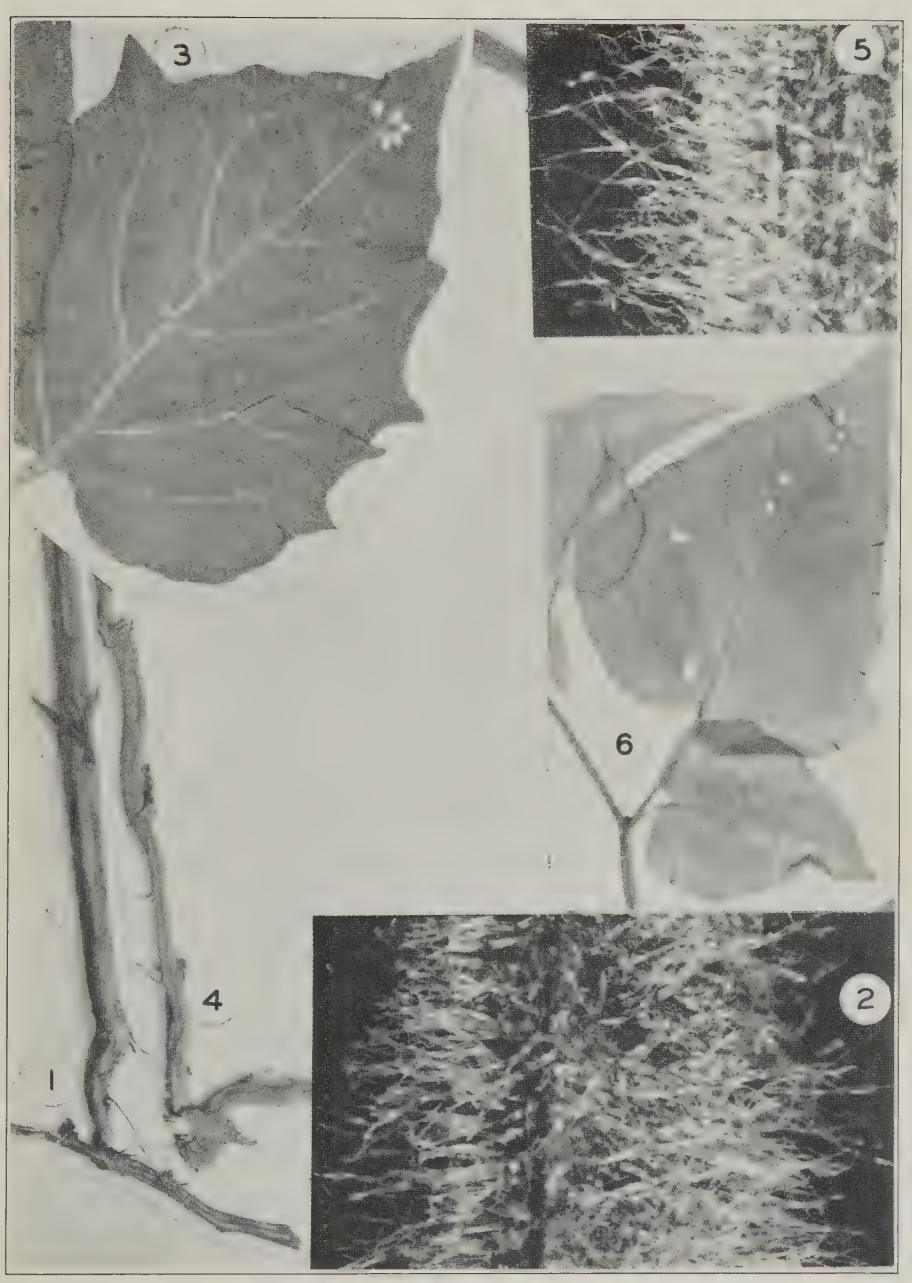

Photo. B. G. Schubert

PHYSALIS HETEROPHYLLA, var. AMBIGUA: FIG. 1, base, × 1; FIG. 2, pubescence of stem, × 10; FIG. 3, leaf, × 1, illuminated from below

Var. NYCTAGINEA: FIG. 4, base, × 1; FIG. 5, pubescence of stem, × 10; FIG. 6, leaves, × 1, illuminated from below

Photo. I. D. Clement

HELIANTHUS ANGUSTIFOLIUS, var. PLANIFOLIUS, portions of TYPE, × 1; FIG. 1, base of plant; FIG. 2, median leaves; FIG. 3, involucre

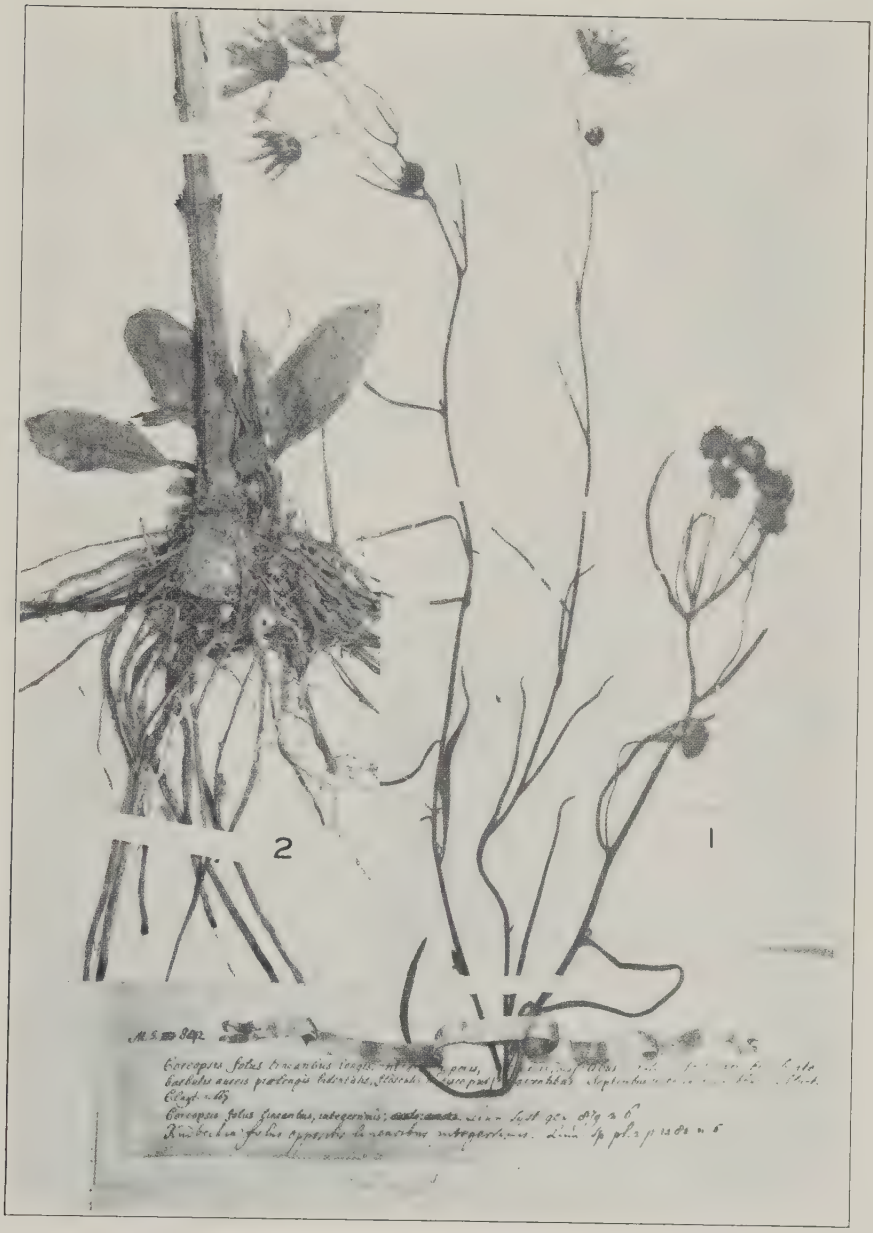

Photo. I. D. Clement

HELIANTHUS ANGUSTIFOLIUS: FIG. 1, TYPE, × ca. ¼; FIG. 2, perennating base of plant, × 1

Photo. I. D. Clement

HELIANTHUS FLORIDANUS: FIGS. 1 and 2, portions of TYPE, × 1; FIG. 3, stoloniferous base, × 1

pens that *G. tinctorium*, var. *floridanum* is a southeastern large-fruited extreme of the Linnaean species!

Whereas true *Galium tinctorium* has the mature pairs of fruits relatively small (2–3 mm. across), var. *floridanum* has them larger, the pairs measuring 3.5–5 mm. across. The longest peduncles of true *G. tinctorium* range from 10–17 mm. long but the longest in var. *floridanum* are up to 23 mm. long, while the longest pedicels of typical *G. tinctorium* are 4–8 mm. long, those of var. *floridanum* ranging up to 13 mm. long. Furthermore, var. *floridanum* often bears long unforking and recurving very slender peduncles suggestive of those of the more northern *G. trifidum* L. Although var. *floridanum* was described only from Florida, it extends along the Coastal Plain of South and North Carolina into southeastern Virginia. The record in Rhodora, xxxvii. 178 (1935) was based on the very large-fruited and smooth *G. obtusum* Bigel., var. *filifolium* (Wiegand) Fern.

Diodia teres Walt., var. hystricina Fern. & Griscom. Add another station in Princess Anne County: hollows in sand dunes, Chesapeake Beach, *Fernald, Long & Clement*, nos. 15,354 (simple, crowded, upright plants) and 15,355 (depressed, freely branching). See p. 100.

*Cephalanthus occidentalis L., forma **lanceolatus,** f. nov., foliis oppositis lanceolatis vel lanceolato-oblongis utrinque attenuatis submembranaceis subtus pallidis, laminis 4–9 cm. longis 1–3 cm. latis.—Southampton County, Virginia: wet thicket bordering Darden's Pond, north of Courtland, September 16, 1946, *Fernald, Long & Clement*, no. 15,357 (type in Herb. Gray.; isotype in Herb. Phil. Acad.). See p. 101.

Cephalanthus occidentalis in its typical form has the leaf oblong-ovate and abruptly short-acuminate. It varies from small-leaved extremes at the northern border of its range, with blades only 4 cm. long and 2.3 cm. broad, to the largest-leaved shrubs or small trees of the southeastern states, with blades up to 2.5 dm. long and 1.5 dm. broad, the leaves either opposite or in 3's. Forma *lanceolatus*, with narrowly lanceolate leaves attenuate to both ends grows at its type-station with the ordinary broad-leaved shrub and strongly contrasts with it.

Although several authors treat the Mexican *Cephalanthus salicifolius* Humb. & Bonpl., as a narrowly lance- or linear-leaved variety of *C. occidentalis*, *C. occidentalis*, var. *salicifolius* (Humb. & Bonpl.) Gray, Syn. Fl. i^2. 29 (1878), they overlook the very

narrow (essentially linear) and elongate outline, the coriaceous texture and the obscure lateral nerves of the latter (and other characters), *C. occidentalis* and forma *lanceolatus* having thinner leaves with the lateral nerves quite evident.

It is possible that forma *lanceolatus* is the shrub cultivated in Europe as the ill-begotten *C. angustifolius* Hort. ex André in Rev. Hort. 1889, 280, 281, fig. 70 (1889) and Dippel, Handb. Laubholzk. i. 164 (1889), this in both cases treated as *C. occidentalis*, var. *angustifolius* André l. c., based on the horticultural binomial *C. angustifolius* Hort. ex André (1889), not Lour. Fl. Cochinch. i. 67 (1790). Since, according to Haviland, *Revision of the Naucleeae*, in Journ. Linn. Soc. xxxiii. 39 (1897), *C. angustifolius* Lour. of Cochinchina has the coriaceous very short-petioled leaves oblong-linear (in *C. occidentalis* oblong-ovate to -lanceolate and membranaceous), the peduncles ebracteate (in *C. occidentalis* with small bracts), the calyx-lobes linear (in *C. occidentalis* ovate), etc., it is evident that the cultivated shrub in European gardens has nothing to do with *C. angustifolius* Lour.; neither does the narrow-leaved form of *C. occidentalis*. I am, therefore, not taking up the later and rather vaguely founded *C. occidentalis*, var. *angustifolius* André.

Viburnum nudum L., var. angustifolium Torr. & Gray. New stations. Nansemond County: wet *Sphagnum* of pine-barrens east of Cherry Grove, south of South Quay, *Fernald & Moore*, no. 15,154, flowering shrubs only 4–6 dm. high. Sussex County: swampy depression in sandy pinelands 3 to 4 miles northwest of Waverly, *Fernald, Long & Clement*, no. 15,360. See p. 93.

The Geographic Varieties of Lobelia puberula.—In his Flora Boreali-Americana, ii. 152 (1803) Michaux described *Lobelia puberula:*

> L. erecta, simplicissima, pubescens: foliis oblongo-ovalibus, obtusis, repando-serrulatis: spica non pedunculata; floribus paucis, alternis, subsessilibus: calycibus ciliatis. *Hab.* in Carolina.

This was regularly taken to be the definitely pubescent plant of coastwise distribution in the Atlantic states, with the calyx-tube densely whitish-hirsute to -villous. When he studied Michaux's Herbarium in Paris in 1851 Asa Gray made a memorandum indicating that the specimen is what he knew and in his

Manual (1848) had described as *L. puberula: "minutely downy-pubescent; leaves ovate or oblong, obtuse, . . .* leafy bracts ovate, acute, serrate as long as the flower, *lobes of the calyx scarcely shorter than the corolla, the auricles as long as the hairy tube"*. Again, when I studied the Michaux Herbarium in 1903, I similarly recorded that the type of *L. puberula* was the coastwise plant we know by that name. That is as it should be, for this pubescent plant so clearly matches Michaux's description and his plant came from Carolina. Michaux generally treated the two Carolinas as one but occasionally North Carolina appeared as Carolina superior, South Carolina as Carolina inferior; but he made a sharp distinction between the Coastal Plain and outer Piedmont region and the high mountains, plants of the latter area growing "in montibus Carolinae", "a Pensylvania ad Carolinam, per montium tractus", "a Canada ad Carolinam montosam". His pubescent *Lobelia puberula* simply from "Carolina" was obviously from east of the mountains, whence there are in the Gray Herbarium 8 sheets (4 from 4 counties in eastern North Carolina, 4 from 3 counties in eastern South Carolina, as well as specimens from 10 counties on the Coastal Plain of Virginia).

In Rhodora, xxxviii. 292 (1936) McVaugh stated that "There is no material of this species in the Michaux Herbarium in Paris". In view of the fact that Asa Gray found and studied it in 1851 and that I did likewise in 1903, it was evident that Michaux's material had existed. Professor Jacques Rousseau, expecting to visit Paris in the autumn of 1946, most kindly offered to look into the matter. Forced to abandon his plan, he communicated with M. J. Léandri of the Muséum d'Histoire Naturelle, who writes that the type of *Lobelia puberula* had merely been misplaced and that "As to the calix, it is similar to the sample of 'B' which Prof. Fernald has sent."

In his study of the genus McVaugh broke *Lobelia puberula* into 4 "pronounced geographic forms which may or may not be worthy of varietal names" (Rhodora, xxxviii. 293 (1936)), saying (p. 292) "In the absence of type material, and in view of the variability of the forms [on the next page they were "pronounced geographic forms"], it seems impossible at present to determine the exact identity of *L. puberula* of Michaux". Under other species with pronounced geographic segregation, as in *L.*

spicata, he definitely called such plants varieties. In view of his "Form a" concentrating itself on the Appalachian Upland and Cumberland Plateau, his "Form b", "on the southeastern Coastal Plain and adjacent Piedmont, New Jersey and Pennsylvania south to Georgia", this the plant described by Michaux from Carolina and checked by Asa Gray in 1851, by myself in 1903, "Form c" "Alabama to Louisiana, especially on the Coastal Plain", and "Form d", Missouri and Arkansas southward to eastern Oklahoma and Texas, and eastward to Alabama and southern Mississippi"—in view of these geographic segregations (much greater than in the admitted varieties of *L. spicata*), it would seem that the 4 extreme and largely isolated trends in *L. puberula* are quite as clear varieties as are those of *L. spicata.* The typical *L. puberula* being the eastern pubescent coastwise plant so adequately described by Elliott with "Tube of the *calyx* short, villous, the segments lanceolate, ciliate, three times as long as the tube" and by McVaugh as his form b with "a densely long-hirsute calyx", etc., we may designate the other three varieties.

*Var. **simulans,** var. nov., a var. typica recedit caule minute puberulo, foliis patentibus, bracteis lanceolatis vel linearibus, tubo calycis glabrescenti vel sparse pubescenti lobis linearilanceolatis 1.5–2 mm. latis. Form a of McVaugh in Rhodora, xxxviii. 293, fig. 12 (1936)—West Virginia to Illinois, south to Florida, Alabama, Mississippi and Louisiana, largely on the upland. Type: Wytheville, Wythe County, Virginia, Sept. 16, 1878, *Howard Shriver* (in Herb. Gray.). The asterisk used since the variety is here named for the first time.

Var. **obtusifolia** (A. DC.), comb. nov. *L. glandulosa,* γ. *obtusifolia* A. DC. in DC. Prodr. vii. 378 (1839). *L. puberula,* β. *glabella* Hook. Bot. Mag. lxi. t. 3292 (1834), not Ell. Sk. i. 267 (1817). *L. puberula,* var. *laeviuscula* Mohr in Contrib. U. S. Nat. Herb. vi. 750 (1901). Form c of McVaugh, l. c. 296 (1936) —Alabama to Louisiana.

I get no difference between the type (in Gray Herb.) of Alphonse De Candolle's *Lobelia glandulosa* γ. *obtusifolia* and the original of *L. puberula* β. *glabella* Hook., nor from the Drummond material from Louisiana from seed of which Hooker's plant was grown. Hooker's varietal name has to be discarded under *L. puberula* on account of *L. puberula,* var. *glabella* of Elliott.

The latter, from Chatham County, Georgia, was defined as follows: "with a stem 12–18 inches high, very smooth; leaves

linear lanceolate, obscurely denticulate; margins of the calyx slightly reflexed. Seems to be an intermediate plant between this species [*L. puberula*] and L. glandulosa". Its exact identity may never be settled, for the specimen is apparently lost. At least, in studying all the types preserved in Elliott's herbarium at the Charleston Museum, Weatherby in RHODORA, xliv. 256 (1942) found nothing to show for it. In his treatment of *L. puberula* McVaugh (p. 292) says of Elliott's variety "probably *L. elongata Small*"; and again (p. 284) "was probably *L. elongata* Small, as was *L. puberula* var. *glabella*, Elliott", but in his discussion of *L. elongata* itself he made no mention of the supposed synonym. Whatever Elliott had, his name invalidates the use of the same appellation for another plant. His diagnosis is to me quite as close to McVaugh's description of *L. glandulosa* Walt. as to that of *L. elongata*. Incidentally Small's *L. elongata* was originally given a very inclusive description but the TYPE was from Northwest in southeastern Norfolk County, Virginia, Small describing the "sepals elongated . . . , entire, as long as the corolla or shorter", while for *L. glandulosa* Small correctly described the "corolla . . . tube much longer than the calyx". The plant at Northwest, type-locality of *L. elongata*, is confined to fresh to brackish tidal reed-marshes along the river and it also abounds on the adjacent fresh to brackish tidal marshes (there as at Northwest, along with *Scirpus Olneyi* and other halophytes or near-halophytes) of North Landing River. Messrs. Griscom, Long or Fogg and I have collected it either at the type-locality or nearby and Mackenzie also got it. I have before me 8 beautiful sheets of it, all quite consistent (except that in one the inflorescence is paniculate-branched). The brittle stem is 0.45–1.5 m. high and all but the most crowded and etiolated ones 4–6 mm thick at base. The leaves are linear- to oblong-lanceolate or oblanceolate, entire or dentate, submembranaceous, the median ones 0.5–2.5 cm. wide; the median bracts of the raceme are linear-lanceolate and 1–2.5 cm. long; the flowering calyx is 1–1.7 cm. long, its non-glangular segments about two thirds as long as the corolla-tube; seeds 0.8–1 mm. long, reticulate-pitted, with cells 3–10 times as long as broad. As already noted, *L. elongata* is a plant of brackish to fresh tidal reed-marsh. Frequently and needlessly confused with *L. elongata* are plants of *L. glandulosa*

Walt., var. with glabrous, instead of densely chaffy-hirsute, calyx-tube, the plant more slender than *L. elongata*, its subcoriaceous leaves linear to linear-lanceolate and mostly 2–8 (rarely –15) mm. broad, the principal bracts of the raceme 0.5–1.8 cm. long, the calyx 6–15 mm. long, its segments usually much shorter than the corolla-tube; seeds 0.5–0.6 mm. long, its pits mostly shorter and more uniform than in *L. elongata*. *L. glandulosa* is a plant of fresh-savannas, pinelands and pine-barrens.

The variety of *Lobelia glandulosa* with glabrous calyx-tube was distributed by M. A. Curtis as *L. glandulosa*, var. *glabra*, he perhaps thinking it the *L. glandulosa* β. *glabra* A. DC. l. c. 378 (1839), from South Carolina, but, unfortunately, Alphonse DeCandolle described the "Foliae ovato-acuta", which will not do for *L. glandulosa*. The variety under discussion may be called

L. GLANDULOSA Walt., var. **laevicalyx,** var. nov. a var. typica recedit tubo calycis glabro.—Florida to eastern North Carolina. TYPE in Herb. Gray.: swampy pineland at Middlesex, Nash County, North Carolina, October 9, 1938, *Godfrey & Kerr*, no. 6661 (distrib. as *L. elongata*).

Returning to the varieties of *Lobelia puberula*, the two remaining varieties here need little further comment. McVaugh's "Form d" is, as he states, var. *mineolana* E. Wimmer in Fedde, Repert. Spec. Nov. xxvi. 4 (1929).

EUPATORIUM RECURVANS Small. To the stations about the Great Dismal Swamp in Norfolk Co. add one in PRINCESS ANNE COUNTY: hollows in sand dunes, Chesapeake Beach, *Fernald, Long & Clement*, nos. 15,363 and 15,364, both nos. showing the fleshy and often 2- or 3-forked tuberous roots which characterize this southeastern species. See p. 101.

LIATRIS.—The monograph of *Liatris* by Dr. L. O. Gaiser, in RHODORA, xlviii, August to December (1946) contains records of several Virginian species and varieties. That the record may be quickly available I am noting these here.

L. SPICATA L. (var. TYPICA Gaiser). Recorded only from Fairfax, Montgomery and Giles Cos. See Gaiser, l. c. 180.

L. SPICATA, forma MONTANA (Gray) Gaiser, l. c. 216. Bath Co.

*L. SPICATA, var. RESINOSA (Nutt.) Gaiser, l. c. Virginian stations cited in Sussex and Dinwiddie Cos. To these add one in NANSEMOND COUNTY: sphagnous and peaty bog by the Norfolk and Western Railway, about ½ mile west of Kilby, *Fernald, Long & Clement*, no. 15,365. See p. 98.

L. GRAMINIFOLIA (Walt.) Willd. (var. TYPICA Gaiser, l. c. 248). Many stations cited, from Arlington Co. to Princess Anne Co., thence westward across the Coastal Plain.

L. GRAMINIFOLIA, var. DUBIA (Barton) Gray. See Gasier, l. c. 250. Stations cited from Arlington Co. to the mountains and down the Coastal Plain to Princess Anne, Sussex and Greensville Cos.

L. GRAMINIFOLIA, var. SMALLII (Britt.) Fern. & Grisc. See Gaiser, l. c. 253. Cited only from the montane counties. Found at inner margin of Coastal Plain in western SUSSEX COUNTY: damp sandy pine and oak woods south of Stony Creek, *Fernald & Long*, no. 11,455.

*L. TURGIDA Gaiser, l. c. 261. Many stations from the Blue Ridge westward.

*L. REGIOMONTANIS (Small) K. Schum. Cited from Wythe Co. See Gaiser, l. c. 277.

L. SCARIOSA (L.) Willd. (var. TYPICA Gaiser, l. c. 294). Cited from many stations in the western counties.

L. SCARIOSA, var. VIRGINIANA (Lunell) Gaiser, l. c. 296. Many stations in the western counties.

L. SQUARROSA (L.) Michx. (var. TYPICA Gaiser, l. c. 394). Stations south to Greensville and Mecklenburg and westward.

LIATRIS ELEGANS NOT VIRGINIAN.—Although the somewhat unique *Liatris elegans* (Walt.) Michx. had its recorded range suddenly extend northward from South Carolina in Gray Man. ed. 2:184 (1856), where it was said to grow in "Barren soil, Virginia?", the doubt was fully justified, for Dr. Gaiser, examining the material in most American herbaria could find no evidence of it from north of South Carolina—see RHODORA, xlviii. 341 (1946).

CARPHEPHORUS TOMENTOSUS (Michx.) Torr. & Gray, var. WALTERI (Ell.) Fernald. To the stations farther inland in dry pine-barren add two in boggy habitats in NANSEMOND COUNTY: sphagnous and peaty bog by Norfolk and Western Railway, about ½ mile west of Kilby, *Fernald, Long & Clement*, no. 15,366; similar habitat 1–1½ miles west of Kilby, *F. L. & C.*, no. 15,367. See p. 98.

CHRYSOPSIS NERVOSA (Willd.) Fern., var. STENOLEPIS Fern. To the few recorded stations add one in NANSEMOND COUNTY: sphagnous and peaty bog by Norfolk and Western Railway, about ½ mile west of Kilby, *Fernald, Long & Clement*, no. 15,368.

Our previous stations in dry pine-barren.

*C. MARIANA (L.) Ell., forma EFULGENS Fern. in RHODORA, xlviii. 60 (1946). Rayless form from 2 stations in SUSSEX COUNTY.

*Solidago juncea Ait., var. **neobohemica,** var. nov., a var. typica recedit involucro 3–4 mm. alto, phyllariis dorso intense viridibus; ligulis 3.5–3.8 mm. longis; corollis disci 3–3.4 mm. longis; pappo maturo 2–2.5 mm. longo; achaeniis 1.4 mm. longis. —Prince George County, Virginia: dry woods and clearings south of New Bohemia, June 7, 1946, *Fernald & Moore,* no. 15,155 (type in Herb. Gray.; isotype in Herb. Phil. Acad.), Sept. 9, 1946, (ripe fruit), *Fernald, Long & Clement,* no. 15,373.

Clearly an extreme of the wide-ranging northern, inland and upland *Solidago juncea,* var. *neobohemica* stands apart as a Coastal Plain variety. Smaller in most parts than the great bulk of *S. juncea,* its measurements mostly touch those of the smaller-headed and -flowered inland and northern plant, but its phyllaries are strikingly dark green along the midrib, those of true *S. juncea* paler and more stramineous. The leaves of the basal rosette are relatively narrow, as are the lower cauline leaves, but the combination of capitular characters combined with the vividly green phyllaries, are most important. Measurements of heads in flower and in fruit from well developed *S. juncea* and several heads in both flower and fruit of var. *neobohemica* give the following results, these checked for me by Dr. Robert C. Foster:

S. juncea: involucre 3.5–4.5 mm. high, phyllaries pale green or stramineous on back; ligules 4–5 mm. long; disk-corollas 3.2–3.8 mm. long; pappus (incl. longest bristles) 2.6–3.3 mm. long; achenes 1.5–1.7 mm. long.

Var. neobohemica: involucre 3–4 mm. high; phyllaries vividly green along midrib; ligules 3.5–3.8 mm. long; disk-corollas 3–3.4 mm. long; pappus 2–2.5 mm. long; achenes 1.4 mm. long.

Solidago juncea in the Maritime Provinces, Quebec and New England has a flowering period (with youngest heads still unexpanded) from earliest July to early September; in New Jersey and Pennsylvania similarly from late June into early September (Stone, Pl. S. N. J. says "Mid-July to early September"); on the Piedmont and upland of Virginia, West Virginia and North Carolina (as shown by a meagre representation) from June 27 to August 22. Near New Bohemia, on the Coastal Plain of southeastern Virginia, var. *neobohemica* was well flowering on June 7. Its season of bloom must have begun in late May. See p. 93.

S. nemoralis Ait., var. Halleana Fern. To the only recorded stations northeast of Georgia (in Northampton County) add one in Nansemond County: sphagnous and peaty bog by Norfolk

and Western Railway, about ½ mile west of Kilby, *Fernald, Long & Clement*, no. 15,374. See p. 98.

*S. FISTULOSA Mill., forma **epilis,** f. nov., caule glabro; foliis glabris vel glabratis.—Nansemond County, VIRGINIA: sphagnous and peaty bog by Norfolk and Western Railway, about ½ mile west of Kilby, September 8 and 12, 1946, *Fernald, Long & Clement*, no. 15,372 (TYPE in Herb. Gray.; ISOTYPE in Herb. Phil. Acad.); sphagnous savanna-like swale east of Cherry Grove, south of South Quay, August 21, 1939, *Fernald & Long*, no. 11,177, and October 15, 1939, no. 11,627.

Typical *Solidago fistulosa* (*S. pilosa* Walt., *S. villosa* Ell.) usually has the internodes (especially the median and upper ones) densely pilose to villous and the lower surfaces of the leaves somewhat so. The three numbers from bogs of Nansemond County are glabrous. See p. 98.

*× S. HIRTIPES Fern. in RHODORA, xlviii. 65, pl. 1011 (1946). SUSSEX COUNTY: roadside thicket about 1½ miles north of Waverly, *Fernald & Long*, no. 15,015.

A very handsome and tall plant, presumably a hybrid of *Solidago graminifolia* (L.) Salisb., var. *Nuttallii* (Greene) Fernald and *S. microcephala* (Greene) Bush. A large and uniform colony. See p. 89.

ASTER SPECTABILIS Ait., var. SUFFULTUS Fernald. An additional station in NANSEMOND COUNTY: sphagnous and peaty bog by Norfolk and Western Railway, about ½ mile west of Kilby, *Fernald, Long & Clement*, no. 15,375, plants smaller than those of dry habitats.

ERIGERON PHILADELPHICUS L., var. **scaturicola** (Fernald), stat. nov., *E. scaturicola* Fernald in RHODORA, xliii. 654, pl. 695, figs. 1 and 2 (1941).

Further experience indicates that the local *Erigeron scaturicola* is better treated as a variety of the wide-ranging *E. philadelphicus.*

BACCHARIS GLOMERULIFLORA PRESUMABLY NOT VIRGINIAN.—*Baccharis glomeruliflora* Pers. was based by Persoon on *B. sessiliflora* Michx., not Vahl, Michaux having found it "in sylvis maritimis Carolinae". Very soon thereafter Pursh cited it as growing "on the coast of Virginia and Carolina". Thereafter it appeared pretty regularly as Virginian, until in the Synoptical Flora Gray cut off Virginia from the stated range. Subsequently its occurrence in the state has been doubted, and, certainly close watching near the coast, southward to Knott's Island and nearly

to False Cape, has revealed only the ubiquitous *B. halimifolia*. Judging from the Gray Herbarium *B. glomeruliflora*, a very distinct species, is rare north of Florida. Aside from the abundant material from that state there are only two sheets from the southeastern states; one from Bluffton in the extreme southeastern corner of South Carolina (*Mellichamp* in 1878); the other from Wilmington (*M. A. Curtis*) in the southeastern corner of North Carolina. We may safely stop straining to see *B. glomeruliflora* in Virginia; probably Pursh did not see it.

*Helianthus angustifolius L., var. **planifolius,** var. nov. (tab. 1083), var. typica recedit caule simplici vel subsimplici 4.5–6 dm. alto; foliis imis mediisque oppositis vel suboppositis planis oblongis vel oblongo-lanceolatis obtusis vel subacutis 3–8.5 cm. longis 6–18 cm. latis, jugis remotis, foliis superioris alternis vel suboppositis.—Southeastern Virginia and apparently north to New Jersey, with typical *H. angustifolius* or by itself. Virginia: *Sphagnum-Magnolia* swamp 2 miles west of Williamsburg, Sept. 27, 1921, *Grimes*, no. 4474, sent for identification and tentatively called *H. Schweinitzii* T. & G.; sandy pine and oak woods south of Stony Creek, Sept. 21, 1939, *Fernald & Long*, nos. 11,470 and 11,471 (type in Herb. Gray.). A specimen from shrubby swamp, with *H. angustifolius*, Lakewood, New Jersey, Sept. 15, 1897, *E. H. Eames*, specimen sent to Gray Herbarium as not good *H. angustifolius*, is placed with var. *planifolius*, although with mostly alternate leaves.

In its blunt leaves and its very slender and low stem var. *planifolius* stands off pretty sharply from typical *Helianthus angustifolius*. The type (plate 1084, fig. 1) of the latter, from eastern Virginia (*Clayton*), belongs to the usual form of the species, commonly tall (up to 1.7 m. high), with often short fascicles in the leaf-axils, the abundant hard and scabrous leaves narrowly lanceolate to linear and long-attenuate, commonly with recurved margins. In its relatively short and blunt leaves *H. angustifolius*, var. *planifolius* simulates *H. floridanus* Gray. Many diverse plants have been sent out as *H. floridanus* and the type, *Palmer*, no. 283 (our plate 1085, figs. 1 and 2), is a mere broken-off top. So far as it shows, however, it has the phyllaries blunter than the caudate-attenuate ones of *H. angustifolius* and its leaves are usually less attenuate to quite blunt. It is matched or strongly approached by a large series of specimens, either broad- or narrow-leaved, found from Florida to Arkansas and

Texas and north to the Carolinas, in which the disk may be either yellow on expanding or brown. Whenever the roots have been well collected they show a slender rhizome, with elongate stolons: such specimens from Florida as *Curtiss*, no. 1437 (PLATE 1085, FIG. 3), on a sheet bearing Gray's validation, *Curtiss*, no. 6727, *Fredholm*, nos. 6084 and 6055, *Small, De Winkeler and Mosier*, no. 11,096; or from Alabama as *Blanton*, no. 7080; from Arkansas as *Demaree*, no. 8794; or from Texas as *Cory*, no. 19,811 and *Parks*, no. 41,008 (this erroneously distributed as the quite different *H. heterophyllus* Nutt.). These specimens, largely identified as *H. angustifolius*, have a very different root-system from true *H. angustifolius*, as typified by the Clayton specimen. The latter species has a knotty, short crown without stolons and in autumn develops crown-buds. Its bases, rarely collected, since it is easier not to do so, are well shown in a few numbered specimens: *Muenscher & Curtis*, no. 6621 from Long Island; *Benner*, no. 479, *Fogg*, no. 9920, *Long*, no. 19,462 from New Jersey; *Allard*, no. 5626 and *Fernald & Long*, nos. 6904 (our PLATE 1084, FIG. 2) and 11,469 from Virginia. Whether *H. floridanus* should be merged as a variety with *H. angustifolius* I do not know. Its root-habit and phyllaries seem to indicate a true species—as species go in *Helianthus*.

*H. ATRORUBENS L., var. ALSODES Fernald in RHODORA, xliii. 74, pl. 1020 (1946). Specimens cited from James City, Princess Anne (TYPE), Sussex and Bedford Counties.

H. MOLLIS Lam., var. CORDATUS S. Wats.

The plants of eastern Virginia previously reported as *H. mollis* belong to var. *cordatus*, with the principal leaves deeply cordate and clasping, typical (mostly inland) *H. mollis* having them with rounded to barely subcordate bases.

*H. DIVARICATUS L., var. ANGUSTIFOLIUS Ktze. JAMES CITY COUNTY: dry open ground about 3 miles north of Williamsburg, *Menzel*, no. 122.

Var. *angustifolius*, found chiefly on the Coastal Plain from Florida to Cape Cod, has narrowly lanceolate leaves (at 7–12 nodes below the solitary head or crowded inflorescence), these caudate-attenuate, the larger ones only 0.6–2 cm. broad and 5–10 cm. long.

*H. TRACHELIIFOLIUS Mill. SUSSEX COUNTY: sandy wooded terrace of Nottoway River, 3 miles north-northwest of Bethel Church, *Fernald, Long & Clement*, no. 15,381.

BALDUINA[1] UNIFLORA Nutt. Gen. ii. 175 (1818), a distinguished and very definite plant with upright small-leaved stems terminated by a large golden-yellow head, therefore not easily overlooked, was described by Nuttall as found "In open grassy swamps from the maritime parts of Virginia to Florida" but its occurrence in Virginia is extremely doubtful. In the Synoptical Flora Gray said under the needlessly substituted *Baldwinia uniflora*, "Low pine barrens, S. Carolina to Florida and Louisiana" and in 1898 Britton & Brown, calling it by a later generic name, *Actinospermum*, said "Virginia (according to Torrey and Gray)" etc. Had they looked up Nuttall's original account they would have discovered that Torrey & Gray merely accepted Nuttall's statement. In the 7th edition of Gray's Manual the doubt was indicated by "Va. (?)". In the Gray Herbarium the northernmost stations represented are in Onslow, Duplin and Sampson Counties, North Carolina, at least 110 miles south of the "maritime parts of Virginia". In North Carolina, as indicated by the labels, it occurs on savannas and peaty pinelands, flowering through August and September. Nuttall was not often guilty of inaccuracy; his statement is a challenge.

EXPLANATION OF PLATES 1056–1085

PLATE 1056, SAGITTARIA PLANIPES Fernald (FIGS. 1–6) and S. LATIFOLIA Willd., var. OBTUSA (Muhl.) Wiegand (FIGS. 7 and 8). S. PLANIPES, all figs. from TYPE: FIG. 1, plant, × ½; FIG. 2, bract, × 10; FIG. 3, broad side, and FIG. 4, narrow side of pedicel, × 10; FIG. 5, anthers, × 10; FIG. 6, achene, × 10. S. LATIFOLIA, var. OBTUSA: FIG. 7, bract, × 10, from Medford, Massachusetts, August, 1865, *Wm. Boott:* FIG. 8, anthers, × 10, from Concord, Massachusetts, July 25, 1893, *W. Deane.*

PLATE 1057, PASPALUM SETACEUM Michx., var. CALVESCENS Fernald, all figs. from TYPE: sufficiently explained in caption of plate.

PLATE 1058, PASPALUM SETACEUM Michx. and var. LONGEPEDUNCULATUM (Le Conte) Wood. P. SETACEUM, all figs. from dry sandy pine-barrens south of Zuni, Isle of Wight Co., Virginia, *Fernald, Griscom & Long*, no. 6465: FIG. 1, lower, and FIG. 2, upper leaf-surface, × 10; FIG. 3, spikelets, × 10. Var. LONGEPEDUNCULATUM: FIG. 4, base of plant, × 1, from Eustis, Lake Co., Florida, *Nash*, no. 1417.

PLATE 1059, PANICUM GLUTINOSCABRUM Fernald, all figs. from TYPE: sufficiently explained in caption of plate.

[1] In spite of his ultra-English spelling of Baldwin, Nuttall's dedication of the genus *Balduina* was a model: "Dedicated as a just tribute of respect for the talents and industry of William Baldwyn, M.D., late of Savannah in Georgia; a gentleman whose botanical zeal and knowledge has rarely been excelled in America".

PLATE 1060, RHYNCHOSPORA PERPLEXA Britton, figs. 1–4, and var. VIRGINIANA Fernald, figs. 5–8. R. PERPLEXA: FIG. 1, terminal corymb, × 1.8, from an ISOTYPE, Florida, *Chapman;* FIG. 2, achene, × 10, from same plant; FIG. 3, achenes, × 10, from Ponce de Leon, Florida, *Curtiss*, no. 6482; FIG. 4, achenes, × 10, from Mobile, Alabama, May, 1845, *Sullivant*. Var. VIRGINIANA: FIG. 5, terminal corymb, × 1.8, from TYPE; FIG. 6, achenes, × 10, from TYPE; FIG. 7, achenes, × 10, from south of Mercy Seat Church, Surry Co., Virginia, *Fernald & Long*, no. 8989; FIG. 8, achenes, × 10, from Airfield Millpond, southwest of Wakefield, Virginia, *Fernald & Long*, no. 14,298.

PLATES 1061–1063, NYMPHAEA ODORATA Ait., var. STENOPETALA Fernald, all figs. from TYPE. PLATE 1061, a colony in pool in the Great Dismal Swamp, Virginia, showing the flowers raised above the leaves, the author at the margin of the pool, × 1/15, after small kodachrome by *H. E. Moore*, this labeled "Water-nymphs in the G. D. Swamp". PLATE 1062, FIG. 1, lower surface of leaf, × 1; FIG. 2, base of flower, showing reflexed sepals, × 1. PLATE 1063, FIG. 1, dorsal, and FIG. 2, ventral view of flower, × 1.

PLATES 1064–1066, RUBUS HYPOLASIUS Fernald, all figs., from the TYPE. Sufficient explanation in the captions.

PLATES 1067–1069, RUBUS SUBINNOXIUS Fernald, all figs. from the TYPE. Sufficiently explained in the captions.

PLATES 1070 and 1071, RUBUS ULIGINOSUS Fernald, all figs. from TYPE. Sufficiently explained in the captions.

PLATES 1072–1074, RUBUS CUPRESSORUM Fernald, all figs. from TYPE. Sufficiently explained in the captions.

PLATE 1075, CROTALARIA PURSHII DC. (fig. 1) and var. BRACTEOLIFERA Fernald (figs. 2 and 3), all figs. × 1. C. PURSHII: FIG. 1, two portions from summit of plant, from general type-area, border of dry sandy woods near Carson, Dinwiddie Co., Virginia, *Fernald, Long & Smart*, no. 5805. Var. BRACTEOLIFERA: FIGS. 2 and 3, portions of summit of TYPE.

PLATE 1076, HYPERICUM CANADENSE L., var. GALIIFORME Fernald, both figs. from TYPE: sufficiently explained in caption of plate.

PLATE 1077, LYONIA LIGUSTRINA (L.) DC., forma NANELLA Fernald, figs. × 1, from TYPE. Sufficiently explained in caption.

PLATE 1078, GENTIANA CATESBAEI Walt. (figs. 1 and 2) and var. NUMMULARIAEFOLIA Fernald (figs. 3 and 4). G. CATESBAEI, both FIGS. 1 and 2 from Walter's TYPE, courtesy of Dr. J. RAMSBOTTOM. Var. NUMMULARIAEFOLIA, FIGS. 3 and 4, the TYPE, × 1.

PLATE 1079, inflorescences of GENTIANA CATESBAEI Walt., both × 1: FIG. 1 from wet pine woods east of Eastville, Northampton Co., Virginia, *Fernald & Long*, no. 5414; FIG. 2 from upper border of sandy and peaty shore of Darden's Pond, north of Courtland, Virginia, *Fernald & Long*, no. 15,343.

PLATE 1080, PHYSALIS HETEROPHYLLA Nees, var. CLAVIPES Fern., all figs. from TYPE. Sufficiently explained in caption of plate.

PLATE 1081, PHYSALIS HETEROPHYLLA Nees (figs. 1–3) and var. CLAVIPES Fernald (figs. 4 and 5). P. HETEROPHYLLA: FIG. 1, base of plant and leaf at upper right, × 1, from sandy soil, Alstead, New Hampshire, *Fernald*, no. 315; FIG. 2, pubescence of stem, × 10, from no. 315; FIG. 3, leaf, × 1, illuminated from below, from Foxcroft, Maine, August 31, 1897, *Fernald*. Var. CLAVIPES, both figs. from TYPE: FIG. 4, leaf, × 1, illuminated from below; FIG. 5, enlarged and subligneous base of stem, × 1.

PLATE 1082, PHYSALIS HETEROPHYLLA, var. AMBIGUA (Gray) Rydberg (figs. 1–3) and var. NYCTAGINEA (Dunal) Rydberg (figs. 4–6). Var. AMBIGUA: FIG. 1, portion of horizontal rhizome and base of erect stem, × 1, from Wallingford, Vermont, August 3, 1907, *G. G. Kennedy;* FIG. 2, pubescence of stem, × 10, from Suffield Township, Portage Co., Ohio, *Webb, Rood et al.*, no. 1547; FIG. 3, leaf, × 1, illuminated from below, from Norwich, Vermont, July 15, 1910, *E. F. Williams*, Var. NYCTAGINEA: FIG. 4, base of plant, × 1, from sandy old clearing near Nottoway River, north of Smith's Ferry, Southampton Co.,

Virginia, *Fernald & Long*, no. 8841; FIG. 5, pubescence of stem, × 10, from dry woods near Middletown, Frederick Co., Virginia, *Hunnewell*, no. 14,019; FIG. 6, leaf × 1, illuminated from below, from no. 8841.

PLATE 1083, HELIANTHUS ANGUSTIFOLIUS L., var. PLANIFOLIUS Fernald, all figs. from TYPE. Sufficiently explained in caption of plate.

PLATE 1084, HELIANTHUS ANGUSTIFOLIUS L.: FIG. 1, TYPE, × ca. ¼, courtesy of Dr. J. RAMSBOTTOM; FIG. 2, ascending caudex and erect basal sprouts, × 1, from pineland northwest of Waverly, Virginia, *Fernald & Long*, no. 6904.

PLATE 1085, HELIANTHUS FLORIDANUS Gray, all figs. × 1: FIGS. 1 and 2, portions of TYPE; FIG. 3, characteristic stoloniferous base, from Duval County, Florida, *A. H. Curtiss*, no. 1437.

THE INADEQUATE BASIS OF THE NAME CARYA PECAN

M. L. FERNALD

Of recent years the Pecan, long and correctly called *Carya illinoensis* (Wang.) K. Koch, has taken on the alluring and quite obvious specific epithet *Pecan*. Under this seemingly appropriate epithet it was published as *Hicoria Pecan* (Marsh.) Britton in Bull. Torr. Bot. Cl. xv. 282 (1888), this specific name promptly accepted by Dippel, Koehne, Coulter, Sargent, Rehder and others, although Sargent in 1889 preferred *Hicorius Pecan* (Marsh.) Sargent in Gard. & For. ii. 460 (1889). Under *Carya* it is *C. Pecan* (Marsh.) Engler & Graebn. in Notizblatt, Append. ix. 19 (1902).

That the name *Juglans Pecan* Marsh. Arb. Am. 69 (1785) antedates *J. illinoensis* Wangenheim, Nordam. Holz., 54, t. xviii, fig. xliii or xxxxiii (1787) there is no doubt, but Wangenheim gave a detailed description and a plate showing a characteristic leaf of "The Illinois Walnut Tree"; he had not got hold of the native name "Pecan"; but Marshal had picked up "Pecan" and not much else. Here was Marshall's account:

> 8. JUGLANS pecan. *The Pecan, or Illinois Hickery.*
>
> This tree is said to grow plenty in the neighbourhood of the Illinois river, and other parts to the westward. The young plants raised from these nuts, much resemble our young Pig-nut Hickerys. The nuts are small and thin shelled.

That is all. The only really descriptive phrase is the last one: "nuts . . . small and thin shelled", with nothing about their distinctive shape, color, 2-locular base and sweet kernel; nor of the winged sutures of the exocarp, nor of the many falcate-

recurving leaflets, etc., etc. This is in marked contrast with the really fairly clear descriptions of all the other "Hickerys" of Marshall, as, for instance, his

> 5. JUGLANS alba minima. *White, or Pig-nut Hickery.*
>
> This generally grows pretty large, sometimes to the height of eighty feet or more, and above two feet in diameter. The bark of young trees is smooth, but when older becomes rough and furrowed. The leaves are generally composed of five pair of lobes and an odd one, which are mostly narrower than those of many other kinds. The fruit is small and roundish, and covered with a very thin husk or covering, opening in divisions. The shell of the nut is also very thin, and easily cracked with the teeth; the kernel plump and full but very bitter. The timber of this is not much esteemed.

This, obviously, is a reasonably good account of *Carya cordiformis* (Wang.) K. Koch. The distinctive characters for his *Juglans Pecan* given by Marshall were: (1) "The young plants . . . resemble those of our young Pig-nut Hickerys"; (2) "The nuts are small and thin shelled", whereas his Pig-nut Hickery was described as having "fruit . . . small . . ., shell of the nut . . . very thin". The differences are not convincingly stated. Sargent, Man. ed. 2, also describes the nut of *C. cordiformis* as "with a thin brittle shell"; that of *C. ovata* "with a usually thin shell, . . . seed . . . sweet", its var. *ellipsoidalis* (from New York to Missouri) "with ellipsoidal . . . nuts abruptly long-pointed at apex" (the nut of the Pecan described as "ovoid to ellipsoidal" with "pointed apex").

Marshall, quite clearly, did not give any really distinctive characters for his *Juglans Pecan*. The only really distinctive point he had was the colloquial name; the other points mentioned by him are also characteristic of a number of Hickories of Illinois, "and other parts to the westward". Unless we treat colloquial names as diagnoses the Marshall account is too inadequate (*nomen subnudum*) for acceptance as a distinctive description. Wangenheim's *Juglans illinoensis* was well described and illustrated, even to the elongate fruit, for, although he had and illustrated from material cultivated on Long Island curved ("fructu reniforme") fruit, it is probable that he had material in which the fruit was not well filled. If we are to accept only names of indubitable application *Carya Pecan* should be discarded in favor of C. ILLINOENSIS (Wang.) K. Koch.

The reasoning, that Marshall's use of the word *Pecan* with the statement that the tree, which he knew only in cultivation, resembled his Pig-nut, and, like it, had the shell of the nut thin, was enough to satisfy Britton and his followers. Recently Britton's former student, Gleason, has been pronouncing that when an author flatly stated that his new species was not an earlier described one of another author, he really meant that it was! Thus, *Lathyrus maritimus* Bigel. Fl. Bost. ed. 2: 268 (1824) was clearly described from material growing on beaches at Dorchester and Chelsea, Massachusetts. Bigelow naturally thought that his plant was what Pursh had really intended by *Pisum maritimum*, Bigelow giving the "*Syn. Pisum maritimum Pursh?*". We should now say *sensu* Pursh, not L., for Pursh had literally copied from Willdenow a brief diagnosis of a European plant and had cited two European plates which, in details, can not be matched by the Dorchester and Chelsea plant. Then, in explanation, Bigelow said:

> "This plant, which has very much the habit and aspect of a pea, is only found on the borders of the beach and salt marsh, whence it has been often taken for the *Pisum maritimum* of Europe. It is, however, decidedly a Lathyrus."

Therefore by Bronxian philosophy we get Gleason's conclusion:

> "I shall maintain the well known and long established name *Lathyrus maritimus* (L.) Bigel."[1]

[1] Gleason in Phytologia, ii. 212 (1947).

Volume 49, no. 582, consisting of pages 145–164 and plates 1064–1077, was issued 10 June, 1947.

RATES FOR SPECIAL NUMBERS OF RHODORA

Many of the single numbers can be supplied only at special prices, as follows:

Vol. 12, no. 134: 50c
no. 138: 45c

Vol. 13, no. 151: 70c

Vol. 14, no. 163: 60c

Vol. 15, no. 171: 45c

Vol. 16, no. 182: 45c

Vol. 17, no. 193: 45c

Vol. 18, no. 205: 50c

Vol. 19, no. 224: 45c
no. 225: 50c

Vol. 21, no. 241: 45c
no. 243: 45c

Vol. 23, no. 265: 45c
no. 268: 45c
no. 269: 45c
no. 270: 45c
no. 271: 45c
no. 274: 45c
no. 275: 45c

Vol. 24, no. 279: 45c
no. 283: 45c

Vol. 25, no. 296: 45c

Vol. 26, no. 304: 50c
no. 305: 60c
no. 306: 45c

Vol. 28, no. 331: 45c

Vol. 29, no. 346: 45c

Vol. 30, no. 351: 50c
no. 356: 45c
no. 357: 45c

Vol. 31, no. 364: 50c
no. 369: 50c
no. 370: 50c

Vol. 32, no. 376: 45c
no. 382: 50c
no. 383: 45c

Vol. 33, no. 386: 60c
no. 388: 45c
no. 389: 45c
no. 391: 45c

Vol. 34, no. 403: 45c
no. 407: 45c

Vol. 35, no. 410: 50c
no. 418: 50c
no. 419: 50c

Vol. 36, no. 425: 55c
no. 426: 50c
no. 429: 70c
no. 430: 55c

Vol. 37, no. 435: 60c
no. 436: 70c
no. 437: 50c
no. 439: 60c
no. 440: 60c
no. 441: 50c
no. 443: 55c
no. 444: 55c

Vol. 38, no. 445: 50c
no. 448: 70c
no. 450: 70c
no. 455: 55c
no. 456: 50c

Vol. 39, no. 458: 50c
no. 463: 55c
no. 464: 75c
no. 466: 55c

Vol. 40, no. 471: 55c
no. 476: 50c
no. 477: 55c
no. 478: 60c
no. 479: 55c

Vol. 41, no. 482: 55c
no. 486: 55c
no. 487: 50c
no. 488: 60c
no. 489: 95c
no. 490: 50c
no. 491: 50c

Vol 42, no. 499: 50c
no. 500: 60c
no. 502: 50c
no. 503: 70c

Vol 43, no 509: 50c
no. 512: 50c
no. 513: 50c
no. 514: 70c
no 515: 75c

Vol 44. no. 520: 70c
no 525: 75c
no. 526: 75c
no. 527: 70c
no. 528: 60c

Vol. 45, no. 531: 60c
no. 532: 55c
no. 533: 55c
no. 534: 75c
no. 535: 70c
no. 538: 85c
no. 539: 75c
no. 540: 75c

Vol 46, no. 542: 50c
no. 544: 60c
no. 545: 55c
no. 546: 55c
no. 547: 50c
no. 548: 45c
no. 550: 55c
no. 551: 55c
no. 552: 50c

Vol. 47, no 553: 75c
no. 554: 50c
no. 555: 60c
no. 556: 75c
no. 557: 75c
no. 558: 50c
no. 559: 75c
no 560: 60c
no. 562: 85c
no. 563: 85c

Vol. 48, no. 566: 60c
no. 567: 50c
no. 568: 60c
no. 569: 50c
no. 570: 50c
no. 571: 60c
no. 572: 50c
no. 573: 70c
no. 574: 70c
no. 575: 70c
no. 576: 50c